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B60S 9/18

(52) UK CL (Edition W):
B7D DAWX

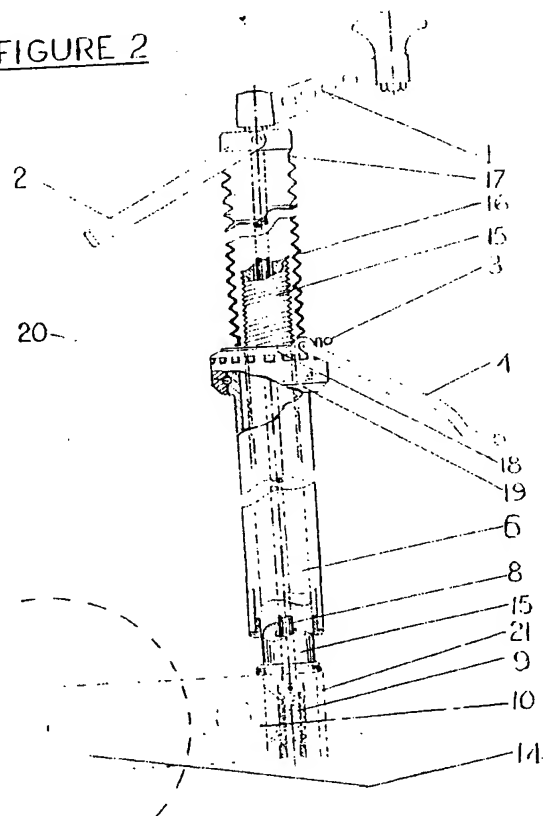
(56) Documents Cited:
GB 2046190 A GB 1579922 A
EP 0112735 A1 EP 0035874 A1
US 5016900 A US 4860841 A

(58) Field of Search:
UK CL (Edition T) B7D, B7J
INT CL⁷ B60S
Other: Online: WPI, EPODOC, JAPIO

(54) Abstract Title: Manoeuvring device for caravans and trailers

(57) A manoeuvring device has a wheel mounted on a stem 6 which clamps like a conventional jockey wheel onto the chassis of a caravan or trailer. However in addition to raising or lowering the coupling-hitch the device is capable of propulsion forward or backward by handle 1 and is steerable by tiller bar 2. These functions are achieved through the hollow vertical stem thus enabling an operator from a standing position to drive and steer the trailer or caravan right up to the rear of the towing vehicle to accurately align the couplings and to lower into exact engagement. The device can also be used as a traction device for propulsion of the towed vehicle over short distances when un-hitched. Propulsion through the vertical stem may be by continuous drive mechanism or by intermittent reciprocating link or cable.

FIGURE 2



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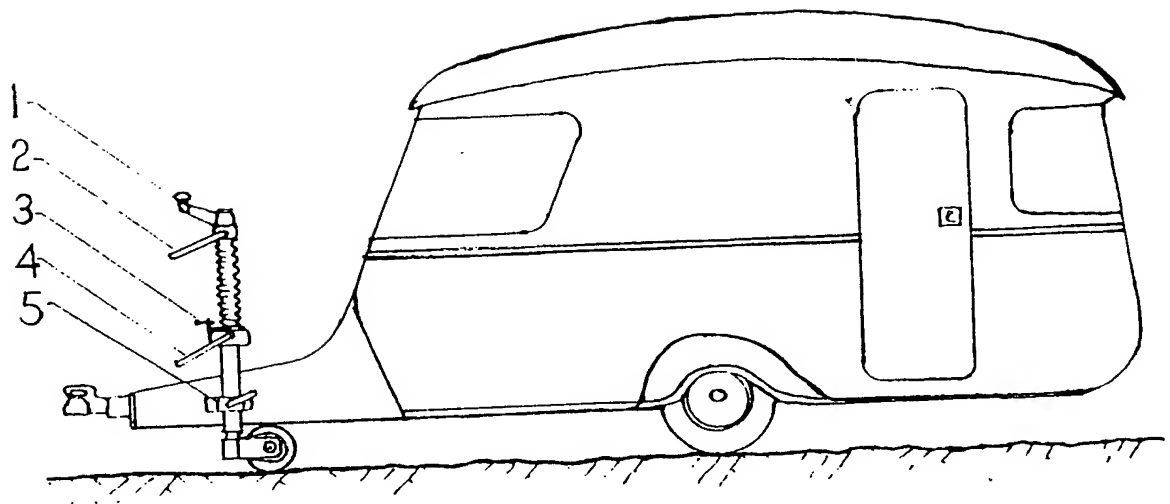


FIGURE 1

FIGURE 2

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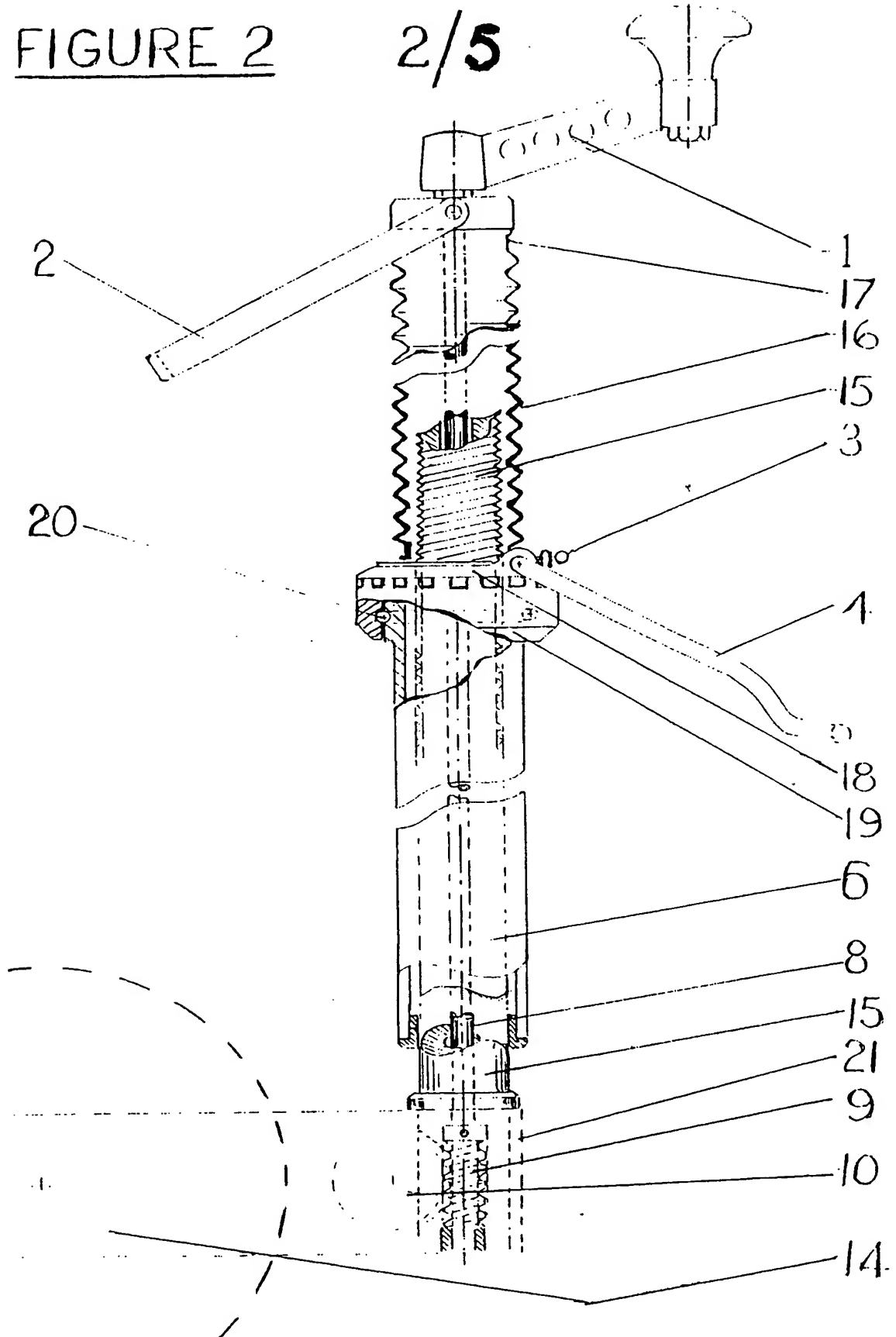


FIGURE 3

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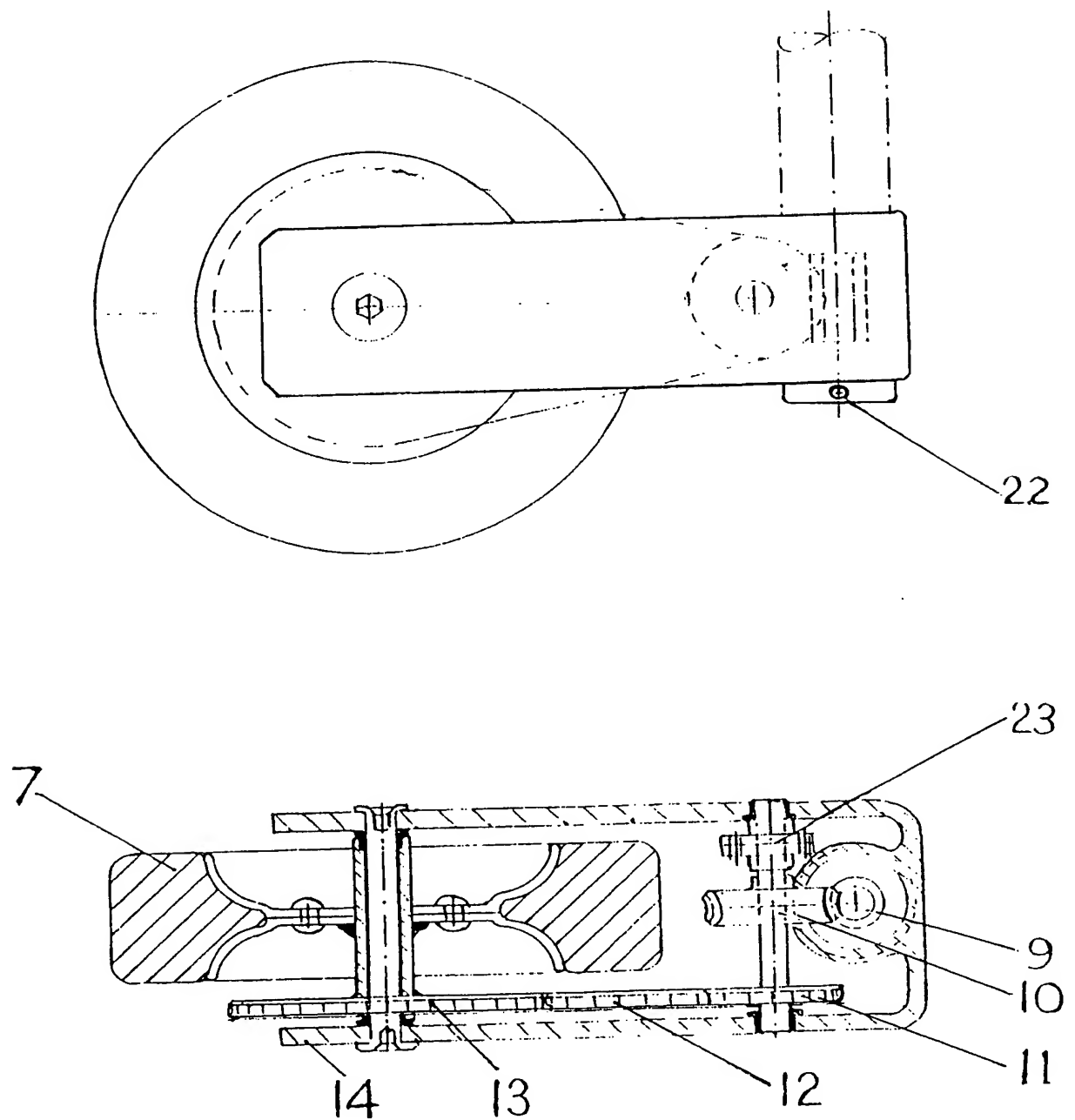


FIGURE 4

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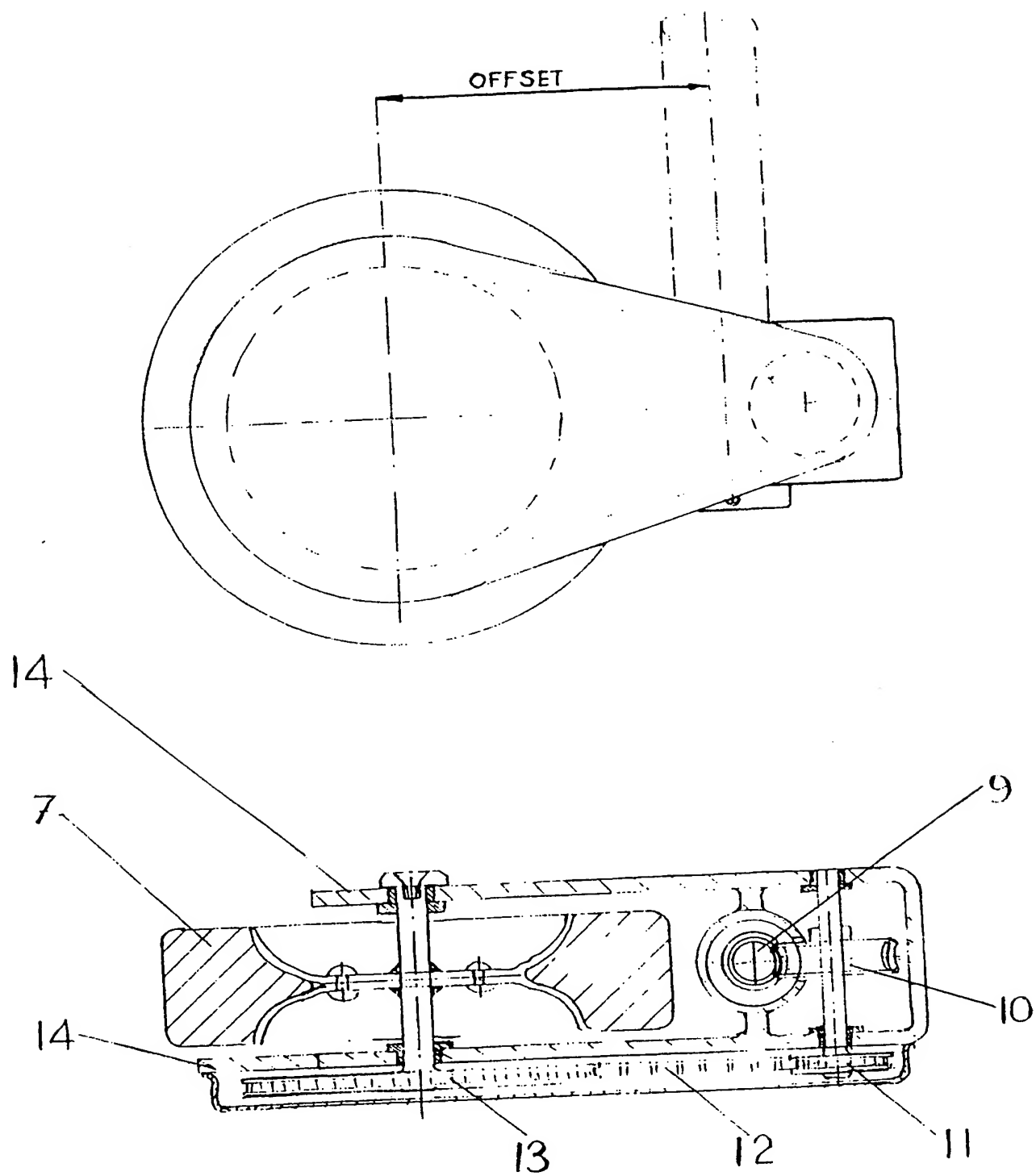
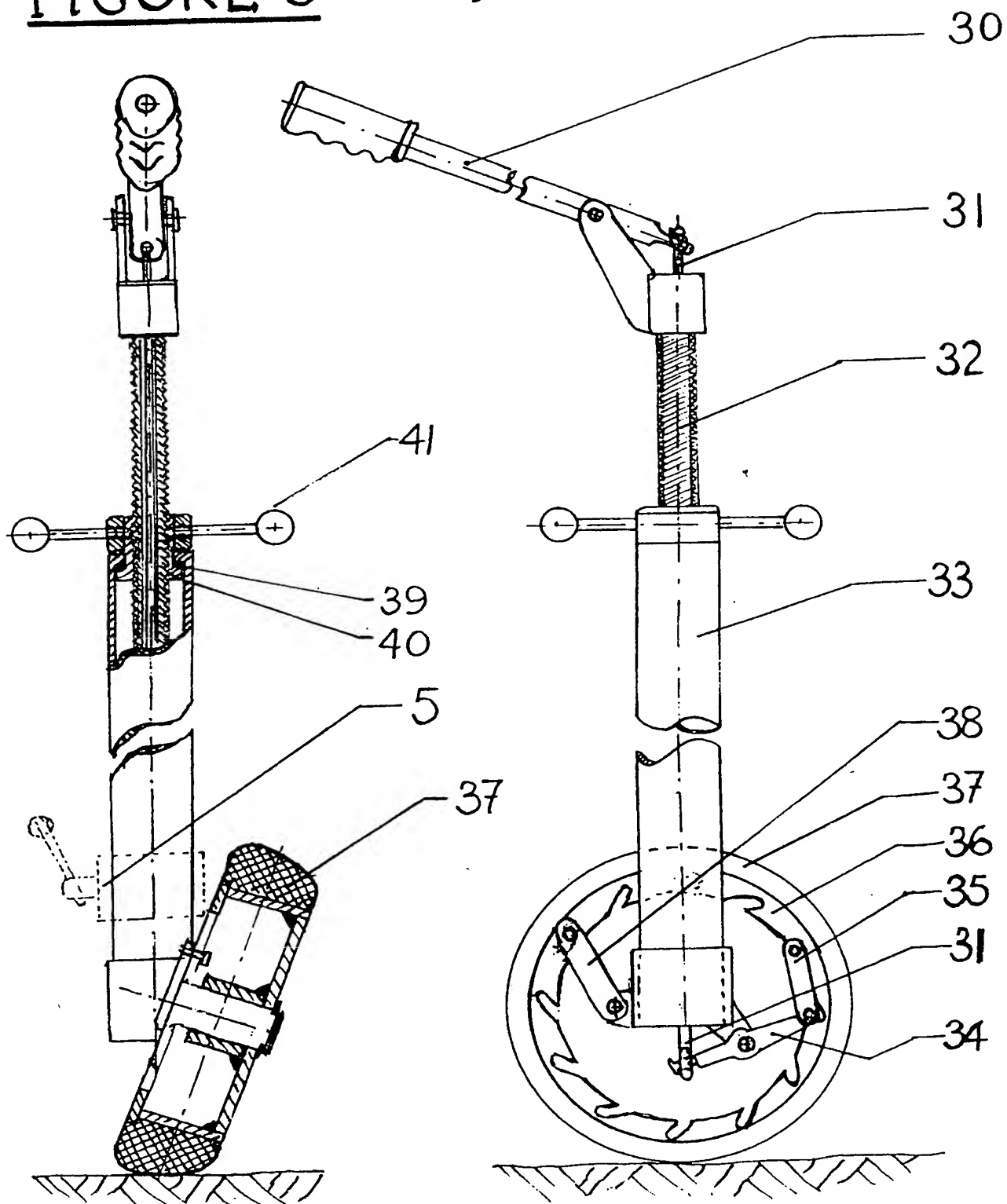


FIGURE 5

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MANOEUVRING DEVICE FOR CARAVANS & TRAILERS

This invention relates to a device for moving trailers and caravans when detached from the towing vehicle.

When using a trailer or caravan there are two problem areas. Firstly, when hitching-up it is difficult to reverse the towing vehicle exactly up to the tow hitch without crashing into it and causing damage. Secondly, it is difficult to shift and manoeuvre the caravan or trailer when disconnected from the towing vehicle, owing to the extreme physical effort required. Both these difficulties make coupling-up and manoeuvring operations almost impossible when attempted single-handedly. Commercially available devices to assist the coupling-up operation are practically non-existent. Electrical position sensors have been employed to give guidance when reversing, but these are easily damaged - especially in the case of a heavy trailer. With regard to the problem of shifting and manoeuvring the towed vehicle when disconnected from the towing, there are several commercially available devices. Usually they are expensive, battery-driven, bulky and cumbersome. Furthermore, they are not readily available at the point of use i.e. they are stored away from the vehicle and require electrical power from an expensive traction battery. Because this type of device requires an operator to stand in front of the coupling hitch, it is impossible to use for the coupling-up operation. The operator is in the way. This is a serious drawback.

According to the present invention there is provided a manoeuvring device in the form of a tractive jockey-wheel which overcomes both of the aforementioned problems. It is convenient and compact, permanently mounted on the towed vehicle and instantly ready for use. The prototype built and tested is hand-powered but this could be electrically-powered by means of an attachment if desired. Because the device is steerable and powered through the vertical mounting stem, the operator may stand to one side of the tow bar and fully complete the hitching-up operation by moving and steering the towed vehicle right up to the hitch of the towing vehicle. When accurately positioned, the coupling may be lowered exactly onto the ball-hitch of the towing vehicle.

A specific embodiment of the invention will now be described by way of an example with reference to the accompanying drawings in which :-

- FIG.1. Shows the device fitted to a caravan.
- FIG.2. Shows section through the vertical stem.
- FIG.3. Shows section through foot with drive to wheel.
- FIG.4 Shows alternative configuration for improved steerability.

Referring to the drawings, the manoeuvring device is operated by means of four basic controls numbered 1 - 4, in addition to the standard stem clamp 5 which clamps around the stem tube 6. Handle 1 is used to drive the wheel 7 forward or backward. Handle 2 is used as a tiller bar to steer the wheel in the required direction. Handle 4 is a ratchet-operated lever which raises or lowers the wheel e.g. on or off the tow-ball of the towing vehicle. The direction of the ratchet is controlled by lever 3.

The main drive to the wheel by means of handle 1 is via a drive-shaft 8 to a worm 9 meshing with a worm-wheel 10, thence to a sprocket 11 and chain 12 to the final drive sprocket 13.

The tiller bar 2 is coupled to the forks 14 through the screwed stem 15. The screw thread is protected by a bellows 16 which has a rotating joint 17. Thus the operation of the tiller-bar 2 controls the steering of the wheel 7.

The lever 4 is operated with a reciprocating motion which rotates a ratchet mechanism 18 connected to a threaded nut 19 engaging with the thread 15. The nut 19 incorporates a thrust bearing with balls 20 in order to transmit forces between the threaded stem 15 and the stem tube 6.

The device shown in FIG.2 can be broken down into two separate parts by removing the tension pin 22 to enable the lower portion of the stem 15 to be withdrawn from the socket 21. This is a useful feature which facilitates initial fitting to a trailer or caravan, especially in cases where the stem tube clamp 5 is an integral part of the coupling. In this event, the stem can be inserted into the clamp from above, and the foot is then attached from below. The use of a spring tension pin, since difficult to remove, is also a deterrent against theft.

Under test, the prototype was found capable of producing a tractive effort equivalent to two men pushing. A drive-disconnecting mechanism 23 was also provided in the shaft of the worm-wheel in the prototype, but this may or may not be found useful. In use, the operator is within easy reach of the handbrake on the trailer or caravan, should there be any tendency to break away.

It was also found when testing the prototype that the effort required to steer (handle 2) was considerable under certain conditions. This is due to the offset of the wheel 7 from the axis of the vertical stem. This offset can be minimised by re-arranging the layout of the gearing to move the wheel closer to the stem as in Fig. 4.

To facilitate commercial production of the device, considerable effort has been made to simplify and cheapen the design. A lighter-duty version is shown in Fig.5. A handle 30 is provided to both steer and drive the device. This handle can be moved up and down in a reciprocating action to drive, or can be swung like a tiller to steer. A tension rod 31 passes through the vertical stem 32 and outer tube 33 to engage a lever 34 and latch 35. The latch 35 engages in a toothed ring 36 which is an integral part of the wheel 37, thus driving the wheel. A sprag 38 prevents run-back. The wheel 37 is canted at an angle of approximately 20 degrees so that its point of contact with the ground lies on the axis of the stem 32. This facilitates the swivelling of the wheel when steering and enables the operator to reverse direction of movement by swinging through 180 degrees. Furthermore, the canted wheel enables maximum retraction upward of the stem through the clamp 5 when not in use, thus giving good ground clearance. This is an important feature.

A simplified form of jacking arrangement is shown in Figure 5. Item 40 is a threaded nut with plain thrust bearing 39. The nut is turned by hand using radial arms 41.

CLAIMS

1. A manoeuvring device for caravans and trailers which is fixed to the chassis comprising a wheel mounted on a stem means for driving steering and jacking the wheel all provided through the hollow vertical mounting stem enabling an operator to carry out these three functions from above the chassis when manoeuvring and coupling up the towed vehicle to the towing.
2. A manoeuvring device as claimed in claim 1 wherein the wheel drive means is a hand-powered rotating shaft passing axially through the vertical stem.
3. A manoeuvring device as claimed in claim 1 wherein the drive means is a hand-powered reciprocating linkage or cable acting through the vertical stem.
4. A manoeuvring device as claimed in any preceding claim wherein the drive means is reversible in the form of a chain or gear or lever reduction mechanism mounted at the top or bottom of the stem.
5. A manoeuvring device as claimed in any preceding claim provided with a safety ratchet or brake.
6. A manoeuvring device as claimed in any preceding claim wherein the wheel is inclined so that its point of contact with the ground lies on the axis of the stem to facilitate the swivelling of the wheel through 180 degrees to reverse the direction of motion.
7. A manoeuvring device as claimed in any preceding claim wherein the primary drive means is an electric motor at the upper end of the stem.

Amendments to the claims have been filed as follows :

- 1) A manoeuvring device for caravans and trailers which is fixed to the chassis comprising a wheel mounted on a stem means for driving steering and jacking the wheel all provided through the hollow vertical mounting stem enabling the operator to carry out these three functions from above the chassis when manoeuvring and coupling up the towed vehicle to the towing.
- 2) A manoeuvring device as claimed in claim 1 wherein the drive means is a hand-powered reciprocating linkage or cable acting through the vertical stem such that the force applied downwards on the operating handle increases the pressure between the wheel and the ground thereby improving traction without slip. (Fig.5)
- 3) A manoeuvring device as claimed in claim 1 wherein the wheel is inclined to the axis of the stem (Fig.5) thereby enabling the wheel to be fully retracted upwards when not in use without the inconvenience of having to remove the wheel in order to provide ground clearance.
- 4) A manoeuvring device as claimed in claim 1 wherein a single operating handle is used for both driving and steering (Fig.5) the aforesaid handle being operable from the front rear or from either side, a change in direction being achieved by rotation through 180 degrees.
- 5) A manoeuvring device as claimed in any preceding claim wherein the wheel is inclined so that the point of contact with the ground lies on the axis of the stem to facilitate the steering or to reverse the direction of motion by swivelling through 180 degrees.



Application No: GB 0221283.5
Claims searched: 1 to 7

Examiner: Colin Thompson
Date of search: 19 December 2002

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X	1,4	GB 2046190 A	(Belton) See whole document
X	1,4	GB 1579922 A	(G A Norman Ltd) See whole document
X	1,2	US 5016900 A	(McCully) See Fig 1
X	1,2,7	US 4860841 A	(Sacco) See Fig 1
X	1,4	EP 0112735 A1	(Pinoit) See whole document
X	1,5	EP 0035874 A1	(Morris) See whole document

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC¹:

B7D, B7J

Worldwide search of patent documents classified in the following areas of the IPC²:

B60S

The following online and other databases have been used in the preparation of this search report:

WPI, EPODOC, JAPIO

WEPD0001EPO

PN - DE3443164 A 19850627
 PD - 1985-06-27
 PR - DE19843443164 19841127
 OPD - 1984-11-27

TI - Support wheel with drive

AB - The subject of the invention consists of a telescopic, swivellable support wheel with a drive.
 In the case of friction wheel drive, the drive is attached to the telescopic tube of the support wheel by means of clamps. In the case of direct drive, the drive is effected via the running wheel axle. With the aid of the subject of the invention, a single-axle trailer can be steered and moved without difficulty in comparison with the previously customary support wheel. The drive is used in particular when manoeuvring a caravan. The support wheel with hand drive (whether friction wheel or direct drive) has the particular advantage that a trailer can be driven independently of an energy supply. With the steering rod, as well as steering, pressure can be exerted on the support wheel in order to ensure sufficient grip between running wheel and ground. If the trailer is pulled by a car, the drive and the steering rod can be removed without difficulty.

IN - HESSLING BRIGITTE (DE)
 PA - HESSLING BRIGITTE
 EC - B62D51/06D ; B62D53/08D3
 IC - B62D59/04 ; B60P3/32

STW91DERW5101

TI - Drive for trailer drawbar support wheel - has friction drive roller pressed into support wheel via demountable fitting
 PR - DE19843443164 19841127
 PN - DE3443164 A 19850627 DW198527 009pp
 PA - (HESS-I) HESSLING B
 IC - B60P3/32 ; B62D59/04
 IN - HESSLING B
 AB - DE3443164 A motor (4) is clamped onto the telescopic support strut (1) for the support wheel and provides simple traction to move the trailer independently of the towing vehicle. The motor is reversible and is brought into contact with the support wheel via a tilting control rod (2).
 - The motor is electrically driven from the trailer battery, or by any other suitable arrangement. A simple manual drive can be provided using a pump action drive on the control rod. The motor drives a concave profile friction roller which presses onto the support wheel.
 - ADVANTAGE - Trailer can be moved with min. manual effort, independently of the towing vehicle.(1/4)
 OPD - 1984-11-27
 AN - 1985-160304 [37]